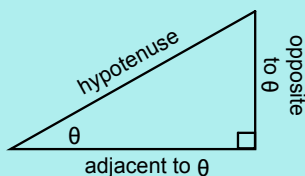


For any angle of interest, there are three (3) primary trigonometric ratios.

$$\text{sine of } \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{cosine of } \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{tangent of } \theta = \frac{\text{opposite}}{\text{adjacent}}$$



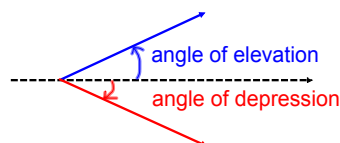
SohCahToa

L5(7.6) - Solving Problems with Trigonometric Ratios

Terminology:

Angle of Elevation (or Inclination): the angle measured above the horizontal.

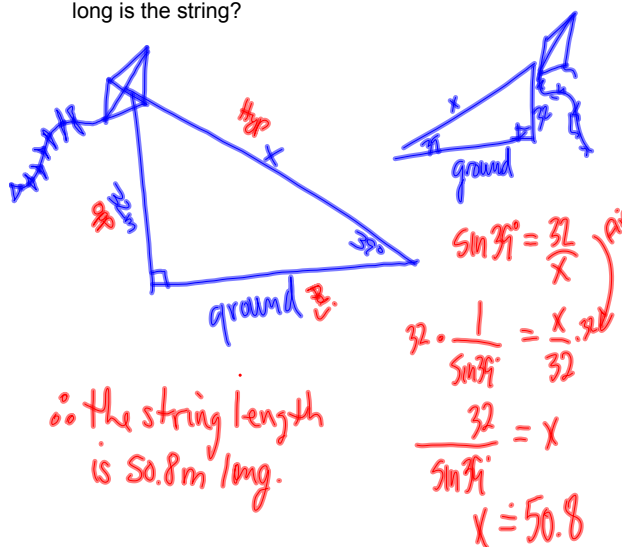
Angle of Depression (or Declination): the angle measured below the horizontal.



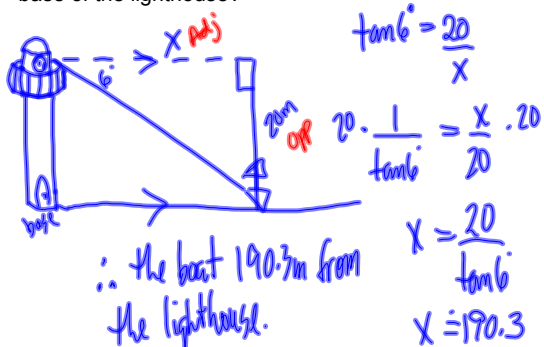
Steps:

- 1) Identify the unknown (what are you looking for?)
- 2) Label the sides of the triangle as opposite, hypotenuse, and adjacent with respect to the given angle (or the unknown if angle is what you are looking for)
- 3) Identify the trigonometric ratio that relates to the unknown and two of the unknowns OR Pythagorean Theorem OR the sum of the angles in a triangle.
- 4) Solve

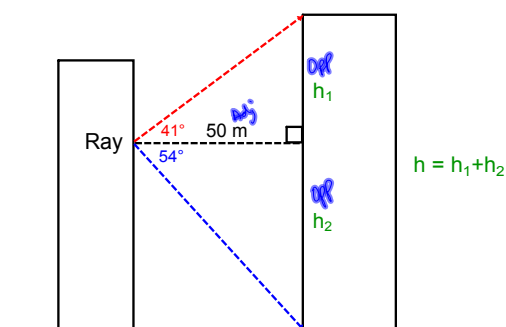
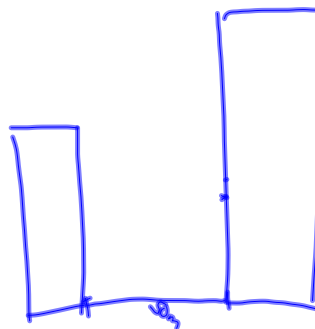
Ex.1 A kite is 32 m above the ground. The string makes an angle of 39° with the ground. How long is the string?



Ex.2 A lighthouse observation deck is about 20 m above sea level. A boat is viewed at an *angle of depression* of 6° . How far is the boat from the base of the lighthouse?

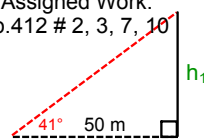


Ex.3 From the window of a building, Ray finds the angle of elevation to the top of a second building to be 41° . The angle of depression to the bottom is 54° . The buildings are 50 m apart. How tall is the second building?



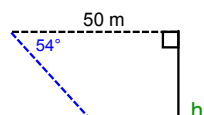
Solve one triangle for h_1 and the other triangle for h_2

Assigned Work:
p.412 # 2, 3, 7, 10



$$\tan 41^\circ = \frac{h_1}{50}$$

$$h_1 = 43.5$$



$$\tan 54^\circ = \frac{h_2}{50}$$

$$h_2 = 68.8$$

$$h_T = h_1 + h_2$$

$$= 43.5 + 68.8$$

$$= 112.3$$

\therefore the buildings height is 112.3m.